

## ***Rulison Monitoring Results***

### **Noble Energy Well BM 36-13**

**Well:** Gas production well Battlement Mesa 36-13, API # 05–045–10840. (Pad 36 is near the Rulison, CO, Site.)

**Operator:** Noble Energy, Incorporated

**Sampler:** U.S. Department of Energy, Office of Legacy Management, Grand Junction, CO.

**Date of Sampling Event:** October 31, 2007

Samples of natural gas and produced water were collected from production well BM 36-13. Details concerning this well are listed in Table 1. A description of the samples collected is found in Table 2.

*Table 1. Well BM 36-13, API # 05–045–10840*

Sample Point	Location	Sea Level Elevation (feet)	Perforation Interval (feet)	Distance (Feet) from		Subsurface		Distance from GZ (miles)	Comment
				N section Line (FNL)	E section Line (FEL)	Latitude	Longitude		
Surface Collection	NWNE S36 T7S R95W	8,683.5	---	730.69	2,122.01	39.398166	-107.943956	0.55	NAD 83
Subsurface Location	NWNE S36 T7S R95W	881.0	1603.0	855.00	2,174.49	39.39786136	-107.944146	0.57	at location

The subsurface elevation is at the midpoint of the perforation interval.

**Link** to Colorado Oil and Gas Conservation Commission information.

**Well:** BM 36-13 <http://oil-gas.state.co.us/cogis/FacilityDetail.asp?facid=04510840&type=WELL>

*Table 2. Sample Description*

<b>Sample No.</b>	<b>Matrix</b>	<b>Sample Description</b>
NDC 647	Water	Production water collected after the separator tank from a valve near the gas line sample port.
NDC 648	Gas	After flushing the sample lines, collected a sample from the gas line before the separator. The gas-line input sample pressure was about 160 psi.

The water sample was submitted to Paragon Analytics in Fort Collins, Colorado for the determination of gross alpha, gross beta, gamma emitting nuclides, and tritium. The results are listed in Table 3.

The natural gas sample was submitted to Isotech Laboratories in Champaign, Illinois for natural gas analysis and the determination of carbon-14 and tritium. The gas analysis results are listed in Table 4.

Table 3. Water Sample NDC 647 Results, Paragon Analytics

RESULTS REPORT  
RIN: 07101216  
Site: Rulison Site  
Location: BM 36-13  
Ticket Number: NDC 647  
Report Date: 3/4/2008

Parameter	Units	Sample Date	ID	Result	Lab	Qualifiers Data	QA	Standard <sup>1</sup>
H-3	pCi/L	10/31/2007	N001	163	U		#	20,000
Ac-228	pCi/L	10/31/2007	N001	42.7			#	
Am-241	pCi/L	10/31/2007	N001	15.9	U		#	
Ce-144	pCi/L	10/31/2007	N001	13.6	U		#	
Co-60	pCi/L	10/31/2007	N001	-4.35	U		#	
Cs-134	pCi/L	10/31/2007	N001	-0.384	U		#	
Cs-137	pCi/L	10/31/2007	N001	1.39	U		#	
Eu-152	pCi/L	10/31/2007	N001	19.8	U		#	
Eu-154	pCi/L	10/31/2007	N001	-4.73	U		#	
Eu-155	pCi/L	10/31/2007	N001	-1.43	U		#	
K-40	pCi/L	10/31/2007	N001	96.6	U		#	
Pb-212	pCi/L	10/31/2007	N001	1.18	U		#	
Pm-144	pCi/L	10/31/2007	N001	-0.604	U		#	
Pm-146	pCi/L	10/31/2007	N001	-0.627	U		#	
Ru-106	pCi/L	10/31/2007	N001	-16.1	U		#	
Sb-125	pCi/L	10/31/2007	N001	3.37	U		#	
Th-234	pCi/L	10/31/2007	N001	27.9	U		#	
U-235	pCi/L	10/31/2007	N001	-5.47	U		#	
Y-88	pCi/L	10/31/2007	N001	4.59	U		#	
GROSS ALPHA	pCi/L	10/31/2007	N001	63			#	
GROSS BETA	pCi/L	10/31/2007	N001	166			#	
CHLORIDE	mg/L	10/31/2007	N001	11000			#	

<sup>1</sup>USEPA Primary Radionuclide Drinking Water Standard.

Table 4. Natural Gas Sample NDC 648 Results, Isotech Laboratories

RESULTS REPORT  
RIN: 07101217  
Site: Rulison Site  
Location: BM 36-13  
Ticket Number: NDC 648  
Report Date: 3/4/2008

Parameter	Units	Sample Date	ID	Result	Lab	Qualifiers Data	QA	Standard <sup>2</sup>
Carbon Monoxide	percent	10/31/2007	N001	nd <sup>1</sup>	U		#	
Hydrogen Sulfide	percent	10/31/2007	N001	nd	U		#	
Helium	percent	10/31/2007	N001	0.0030			#	
Hydrogen	percent	10/31/2007	N001	0.0041			#	
Argon	percent	10/31/2007	N001	nd	U		#	
Oxygen	percent	10/31/2007	N001	0.0051			#	
Nitrogen	percent	10/31/2007	N001	0.058			#	
Carbon Dioxide	percent	10/31/2007	N001	2.02			#	
Methane	percent	10/31/2007	N001	91.20			#	
Ethane	percent	10/31/2007	N001	4.45			#	
Ethylene	percent	10/31/2007	N001	nd	U		#	
Propane	percent	10/31/2007	N001	1.26			#	
Isobutane	percent	10/31/2007	N001	0.262			#	
Butane	percent	10/31/2007	N001	0.273			#	
Isopentane	percent	10/31/2007	N001	0.113			#	
Pentane	percent	10/31/2007	N001	0.0844			#	
Hexanes	percent	10/31/2007	N001	0.265			#	
Carbon-14	Percent modern carbon	10/31/2007	N001	0.2	U		#	
Tritium	pCi/L methane	10/31/2007	N001	0.054	U		#	

<sup>1</sup> Not detected.<sup>2</sup> There are no applicable standards for natural gas.

SAMPLE ID CODES: 000X = Filtered sample (0.45 µm). N00X = Unfiltered sample. X = replicate number.

LAB QUALIFIERS:

U Analytical result below detection limit.

DATA QUALIFIERS:

F	Low flow sampling method used.	G	Possible grout contamination, pH > 9.
J	Estimated value.	Q	Qualitative result due to sampling technique.
L	Less than 3 bore volumes purged prior to sampling.	X	Location is undefined.
R	Unusable result.		
U	Parameter analyzed for but was not detected.		

QA QUALIFIER:

# Validated at Level 1 according to quality assurance guidelines.